Preventing Overtraining Injuries Related to High Running Volume

Given the very strong evidence showing higher running mileage as an injury risk factor, an obvious intervention is to reduce the amount of running performed by Servicemembers.

Both military and civilian research that identifies high running volume significantly increases the risk for lower extremity injury. During initial military training about 25 percent of men and about 50 percent of women incur one or more physical training-related injuries. About 80 percent of these injuries are in the lower extremities and are of the overuse type—a condition brought about by physical training volume overload (generally excessive running). -- DoD Joint Services Physical Training Injury Prevention Work Group (JSPTIPWG), 2007.

Naval Health Research Center, San Diego
Running mileage: Given the very strong evidence showing higher running mileage as an injury risk factor, an obvious intervention is to reduce the amount of running performed by Servicemembers. This intervention was been tested among recruits in 12-week Marine Corps boot camp. The table below shows the running distances, stress fracture incidence, and final 3-mile run times for three groups of U.S. Marine recruits, with each group performing different amounts of organized running. A 40-percent reduction in running distance was associated with a 53 percent reduction in stress fracture incidence and only slightly (3 percent) slower run times. Thus, reducing running mileage reduced stress fracture incidence with minimal effects on aerobic fitness.

Table: Mileage, stress fracture incidence, and final 3-mile run times among three groups of male U.S. Marine Corps Recruits

Marines (n)	Total run distance over 12 weeks (mi)	Stress fracture incidence (n/100)	Final 3-mile run times (min)
1136	55	3.7	20.3
1117	41	2.7	20.7
1097	33	1.7	20.9

Recommendation:

The JSPTIPWG strongly recommends the de-emphasis of distance running during physical training to prevent overtraining. Overtraining (caused largely by excessive distance running) results in higher injury rates, lowered physical performance, decreased motivation, and attrition. Good evidence was found that physical training programs, especially in initial military training, that reduce distance running miles and incorporate the following elements prevent overtraining and reduce injury rates while maintaining or improving physical fitness.

- Commanders at all levels should actively avoid combinations of physical and military training that exceed physiologic thresholds of overtraining that result in higher injury rates and do not improve fitness.
- Follow a standardized, gradual, systematic progression of running distance and speed beginning with lower mileage and intensity, especially for those just starting a physical training program (e.g., new recruits, changing units, or returning to PT after time off for an injury or leave).
- Structure physical training injury prevention programs to target those Servicemembers at the highest risk of injury (those of average or below average fitness) by ensuring that the running mileage for the least fit Servicemembers is appropriate for their fitness level.

- Use fitness test performance (run times) to place Servicemembers in ability groups of similar fitness levels that provide each Servicemember with a more appropriate level of physiological stimulus to enhance fitness and minimize injury risk. (Running by time, not distance, allows the least fit to run shorter distances than the most fit, thus accommodating low and high fitness groups simultaneously.)

- Avoid remedial physical training programs that require the least fit Servicemembers, especially recruits, to do more training than fit Servicemembers since it significantly increases risk of overtraining and injury with little or no fitness improvement. (Gradual, progressive ability group training programs improve fitness with less risk of overtraining and injury.)

- Limit formation running as it overtrains the least fit and provides an inadequate training effect for the most fit.

- Replace some distance runs with higher intensity, shorter distance runs that increase speed and stamina more rapidly than distance running while limiting total miles run.

- Avoid exhaustive military or physical training (e.g., obstacle courses, long road marches with heavy loads, longer runs, maximal-effort physical fitness testing, etc.) on the same or successive days.

- Allow adequate recovery time between administrations of maximal effort physical fitness tests (ideally 3-5 days for Servicemembers in operational units) to prevent overtraining and increase the likelihood of improved physical performance.

- Alternate training days that emphasize lower body weight-bearing physical activity with training days focused on upper body conditioning.

- Minimize the accumulated weight-bearing stress on the lower body from marching/hiking, movements to training sites, drill and ceremony, obstacle courses, running, etc., by not over scheduling such activities on the same or successive days.

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